

Object has a density of 0.78 g/cm^3 and is a rectangular prism. If the mass is 5 g, the length is 3 cm, width is 7 cm, what is the height of the object?

$$D = 0.78 \text{ g/cm}^3$$

$$m = 5 \text{ g}$$

$$V = (\text{length})(\text{width})(\text{height})$$

3 cm 7 cm ?

①

$$D = \frac{m}{V}$$

$$h(D) = \left(\frac{m}{lwh} \right) h$$

$$\frac{h}{\cancel{h}} = \left(\frac{m}{lw} \right) \frac{1}{\cancel{D}}$$

$$h = \frac{m}{lwD}$$

$$= \frac{5 \text{ g}}{(3 \text{ cm})(7 \text{ cm})(0.78)}$$

$$= 0.31 \text{ cm}$$

② ①

What is Matter?

- Anything that has mass and takes up space
- Two categories:
 - Substance
 - Mixture



- Substances

- Element →

1	Hydrogen	1
	H	
	1.008	

- Compound

- Elements

- Pure substances that are made up of only 1 type of atom

- 118 known elements

- 92 occur naturally

- Only an element if it is on the Periodic Table

Periodic Table of the Elements															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
H	He														
Li	Be	B	C	N	O	F	Ne								
Na	Mg	Al	Si	P	S	Cl	Ar								
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te
Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po
Fr	Ra	*Ac	Rf	Ha	106	107	108	109	110						

* Lanthanide Series
* Actinide Series

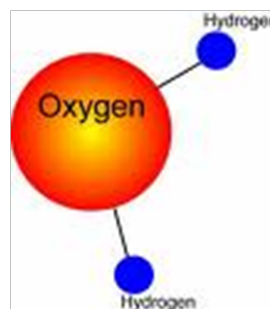
- We write elements with the first letter capital and the second (if applicable) as lowercase

- Atoms → the smallest unit of an element that is still the element

- All atoms of the same element have the same basic structure

- Compounds

- Two or more elements bonded together in a fixed proportion



- Example: $\text{H}_2\text{O} \rightarrow \text{water}$
always 2 H's for every 1 O

- If you see two elements written together with no spaces, it is a compound

- Physical processes CANNOT separate compounds

- Compounds have different characteristics than the elements that combine to form them



Sodium
(Na)



Chlorine
(Cl)



Salt
(NaCl)

- Molecule

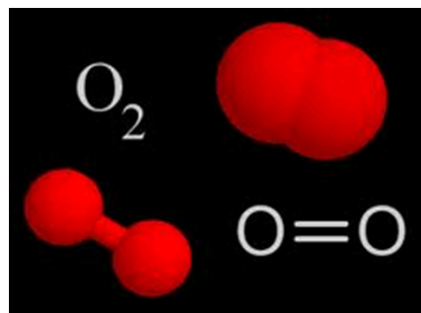
- Two or more

- of the same element

- bonded together in a

- fixed proportion

- The smallest form of a compound that can exist and still have the same properties of the compound



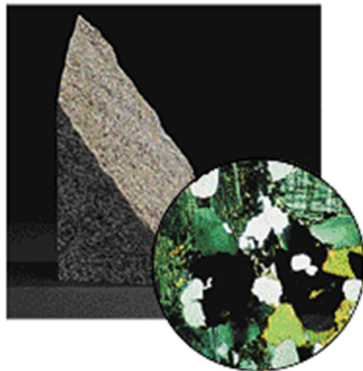
- Mixtures:
 - Contain more than one type of matter that is NOT chemically bonded together
 - Can be separated physically
 - Two types:
 - Homogeneous
 - Heterogeneous



Both pictures are heterogeneous mixtures

- Heterogeneous Mixtures:
 - Matter is not made up of the same proportions
 - Can be separated physically
- Homogeneous Mixtures:
 - Matter is the same throughout; evenly blended
 - Also called a solution





A Granite, a heterogeneous mixture

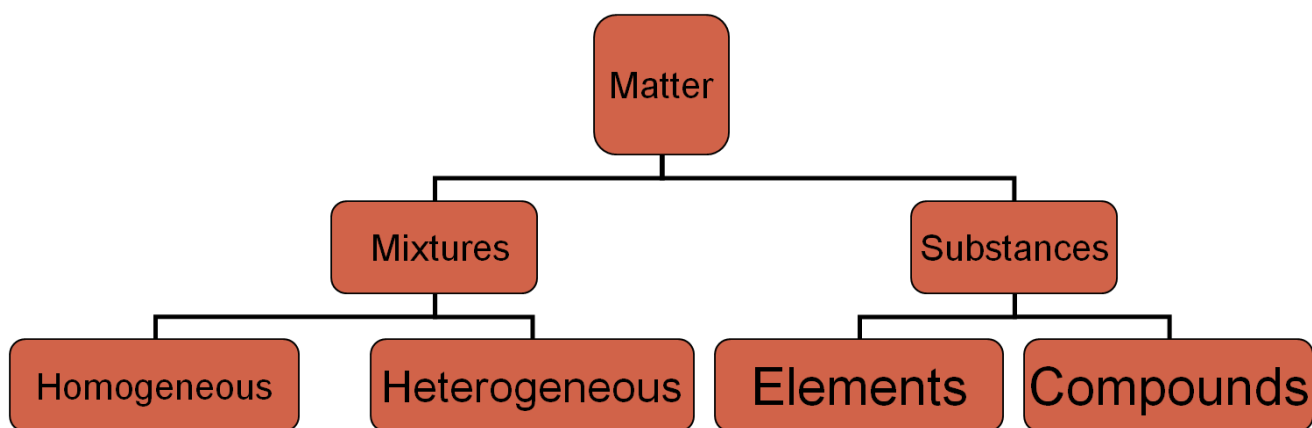


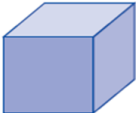
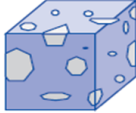
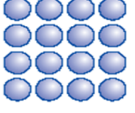
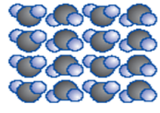
B Human blood, a heterogeneous mixture



C Copper(II) sulfate (CuSO_4) in water, a homogeneous mixture (solution)

Examples



Types of Matter			
			
Homogeneous mixture	Heterogeneous mixture	Element	Compound
Type of matter	Definition		Examples
Homogeneous mixture	A mixture that contains more than one type of matter and is the same throughout.		soda pop, air, chocolate ice cream
Heterogeneous mixture	A mixture that contains more than one type of matter and is not the same throughout.		chicken soup, soil, fudge ripple ice cream
Element	A substance that contains only one type of atom.		copper metal, oxygen gas, liquid nitrogen
Compound	A substance that contains more than one type of atom.		table salt, rust (iron oxide), carbon dioxide gas